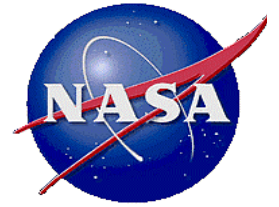# OSMA Training Perspectives

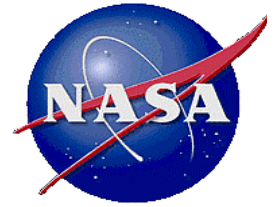## Presented at the Technical Excellence Summit

NASA Safety Center

July 23-24, 2008

Homayoon Dezfuli
Manager, System Safety, Office of Safety and Mission Assurance
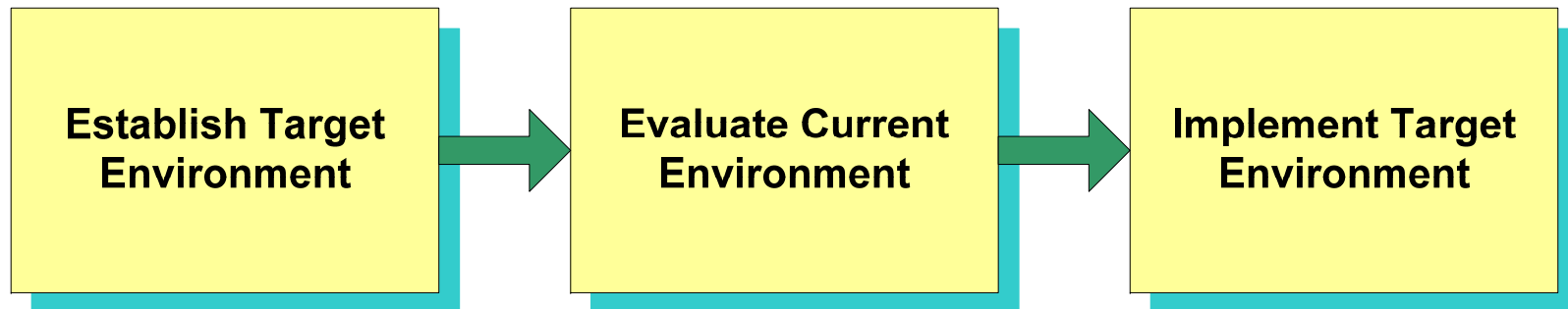NASA Headquarters

Acknowledgement

- **My OSMA colleagues who contributed to this talk:**
  - **Frank Groen**
  - **Peter Prassinos**
  - **Michael Stamatelatos**
  - **William Vesely**

A Simple Model for Making Change and Improvements

Establish Target Environment	→	Evaluate Current Environment	→	Implement Target Environment

- **Environment: A collection of attributes that are necessary for the functioning of a process, activity, program, etc.**
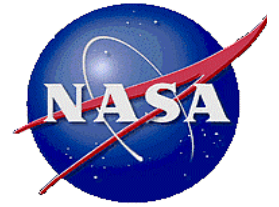
- **SMA Environment:**
  - **Directives (including responsibility and authority)**
  - **Technical guidelines and procedures**

    Policies and Procedures

  - **Technical skills of individuals and their desire to excel**
  - **Attitudes and perceptions of individuals regarding their roles**
  - **Etc.**

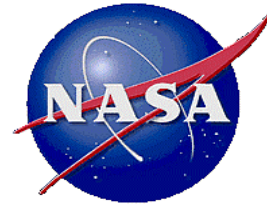   **Workforce Skills and Motivations**

Attributes of the SMA Target Environment

- **Policies and Procedures**
  - A set of *consistent* and *coherent* directives and associated technical procedures that promotes
    - Technical rigor in SMA products and services
    - Engagement in and contribution to systems engineering and decision processes throughout lifecycle
    - True integration of SMA activities to manage safety and risk

Merriam-Webster (http://www.m-w.com) dictionary defines:

- Consistent: agreement or harmony of parts or features to one another or a whole: without contradiction

- Coherent: systematic or logical connection

Attributes of the SMA Target Environment (cont.)

- ## Workforce Skills and Motivations
  - A technically qualified SMA workforce that is recognized as the critical supplier of safety, reliability, risk analysis, and assurance services
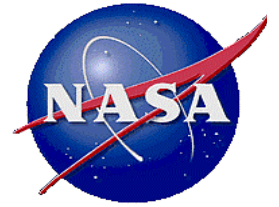
    - Subscribes to a *systems approach* to SMA activities
    - Subscribes to technical rigor to enhance credibility
    - Motivated to proactively learn and apply new technical skills and tools
    - Self-assesses and corrects technical inadequacies

    Attributes of Technical Excellence
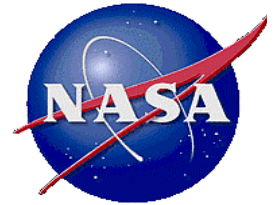
Systems Approach to SMA Activities
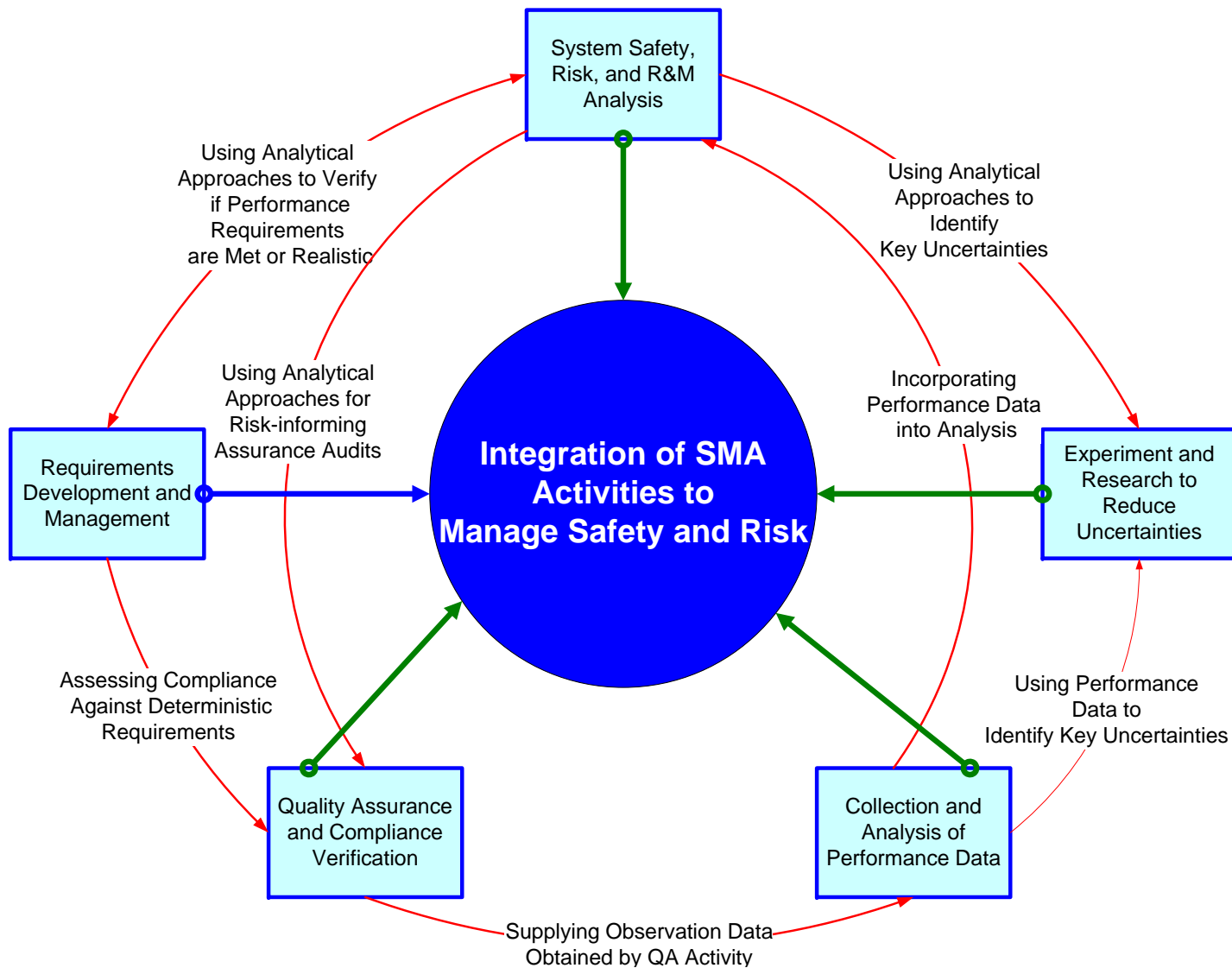
SARD's Perspective of the Current SMA Environment

- ## Policies and Procedures
  - Key policy documents are becoming more consistent and coherent
    - Advocate a proactive, analytic, and integrated approach to risk-informed management of safety and technical risks
    - Advocate integration of SMA activities with systems engineering and decision processes

- ## Handbooks and procedural documents are still needed
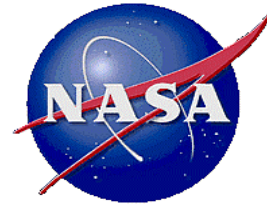
SARD's Perspective of the Current SMA Environment

- **Workforce Skills and Motivations**
  - Experienced in detailed, qualitative assessments
  - Limited use of analytic, integrated modeling approaches
  - Limited knowledge of statistics, probability theory, and uncertainty quantification (per NESS)
  - New skills learned on as–needed basis (reactive versus proactive)
  - Most available, offered training lack technical rigor, consistency, and coherence
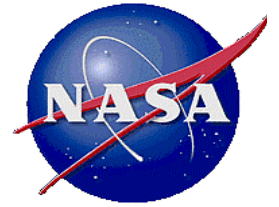
System Safety Example

- **Policy and Procedures**
  - **The requirements for system safety (SS) were revised significantly in July 2006 (NPR 8715.3)**
  - **The changes were made to introduce technical rigor into SS modeling and to couple it with systems engineering and decision processes (Target Environment)**
  - **Prior to this change**
    - **System safety practices had remained grounded in the modeling approach of the 1970s**
    - **Lacked technical rigor and systems approach**
    - **SS Product: Qualitative Hazard Analysis Report AND Risk Metrics**
  - **This state of affair was *incoherent* with Agency's initiatives to advance Probabilistic Risk Assessment application**

- **Workforce Skills**
  - **Qualitative hazard analysis and qualitative risk analysis are pervasive**
  - **Most available, offered SS training are *inconsistent* with the change in policy direction**
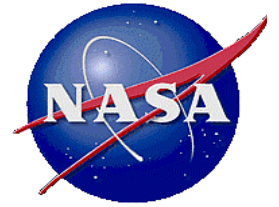
Attributes that Should be Considered for SMA Training

- **Consistency with Agency's policy and directives**

- **Promotes technical rigor**

- **Promotes analytical approaches**

- **Promotes systems view**

- **Addresses Agency's technical needs**

- **Coherence among training courses**

- **Supports risk-informed decision making**
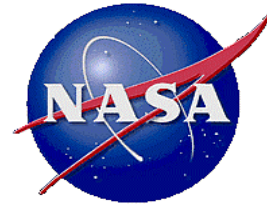
Critical Competencies In Relation to Training Attributes

- **Core training is needed to address limitations in SMA workforce skills including**
  - **Probabilistic Analysis for Engineers**
  - **Analytical System Safety Analysis (e.g., Scenario-based Hazard Analysis)**
  - **Analytical Reliability Analysis**
  - **Risk-informed Decision Analysis**

- **OSMA will lead in developing these courses and interface with NSC for their delivery**

- **OSMA has initiated work on these courses**